

SCIENCE

And Technology Program



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FY 1999 - 2001

There is an on-going need to understand how the hydrology, geology, biology, and economic activity in the watershed affect the water quality and chemistry of Bureau of Reclamation reservoirs. By investigating contaminant source areas and transport pathways in reservoirs and watersheds, this project seeks to identify land use and O&M practices that may help solve water quality problems. This project will benefit Regional water quality specialists in developing Water Quality Management Plans and TMDL (total maximum daily load) criteria for non-point contaminant sources. This project is directly applicable to other watershed- and basin-scale non-point approaches required under the Clean Water Action Plan. ER.99.21 proposes to form partnerships with Regional and Area Office projects that would benefit from environmental chemistry expertise in solving their particular reservoir and watershed chemistry problems.

Two cooperative studies are being performed for ER.99.21:

- Mercury (Hg) in Lake Owyhee, Oregon: Hg contamination from natural geological sources and historical mining has caused Hg bioaccumulation in fish, resulting in issuance of fish consumption advisories throughout the watershed by public health agencies in Idaho, Oregon, and Nevada. Identification of Hg sources, movement, and cycling within Lake Owyhee will provide information needed to develop land use and reservoir management practices to minimize bioaccumulation. The Owyhee Hg study involves (1) chemical analysis of water and sediments from the reservoir and inflows, (2) assessment of historical data, and (3) a collaborative remote sensing project that will apply the AVIRIS (Airborne Visible and Infrared Imaging Spectrometer) spectral imaging instrument to identify and map Hg-containing mineral deposits in the watershed.
- Sediment-Water Interactions in Ridgway Reservoir, Ridgway, Colorado: Trace metal releases from sediments were predicted prior to first filling, using a microcosm sediment-water simulation study. To assess the applicability of the simulation method as a predictive tool for estimating post-impoundment chemistry in reservoir bottom waters, the results of the 1981 Ridgway simulation study have been compared to a 10-year, post-impoundment monitoring data set.

The two objectives for ER.99.21 this fiscal year were:

- Owyhee Study: Complete Lake Owyhee reservoir and inflow water sample collection activities, complete all chemical analyses, analyze water and sediment data, and prepare draft TSC-R Report manuscript. Continue calibrating and processing AVIRIS spectral data to identify and map areal distribution of Hg-containing minerals in the watershed near Lake Owyhee.
- Ridgway Study: Revise 1998 draft Ridgway simulation report based on UC Region cooperator comments, and have revised text reviewed and edited by a technical editor.
- Owyhee Study: All field sampling and analysis have been completed and all chemistry data for water and sediment samples have been reviewed and validated. Data have been analyzed and the final report manuscript is in process, with expected publication as a TSC R-Report and journal manuscript during the first half of FY

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2000. AVIRIS data processing is awaiting receipt of spectrally corrected data from the NASA Jet Propulsion Laboratory, Pasadena, California, before final ground calibration corrections and mapping of Hg mineral distributions.

- Ridgway Study: The Ridgway manuscript has been revised, based on UC Region cooperator peer review, and the resulting draft has been reviewed by a TSC technical editor.

The partners for the different research tasks are as follows:

- Owyhee Study: David Zimmer, USBR PN Region Water Quality Specialist, Boise, Idaho; Paul Seronko, Bureau of Land Management, Boise, Idaho; Ernie Paylor, NASA/JPL, Pasadena, California; Mark Ferns, Oregon Department of Geology and Mineral Resources; Roger Clark, USGS, Denver, Colorado.
- Ridgway Study: Jerry Miller, Water Quality Specialist, USBR UC Region, Salt Lake City, Utah.

Craft, Douglas. September 1998. The Chemistry of Lake Owyhee, Oregon: Preliminary Results from Recent Sampling. Proceedings Paper, Bureau of Reclamation Water Quality Workshop, Portland, Oregon.